

What is claimed is:

1. An image forming process comprising the step of:

fixing a toner onto an electrophotographic image-receiving sheet with the use of a belt fixing and smoothing device,

the toner containing a wax and a binder;

the electrophotographic image-receiving sheet having at least one toner-image-receiving layer containing a wax and a binder;

the belt fixing and smoothing device comprising:

a heating and pressuring member,

a belt member,

a cooling device, and

a cooling and separating unit,

wherein the belt fixing and smoothing device, the electrophotographic image-receiving sheet, and the toner satisfy the following conditions represented by

Expressions (I), (II), and (III):

(I): Temp1 > Temp2 > Temp3 > (Temp 4 - 20 °C)

(II): Temp1 > Temp5 > Temp6 > (Temp 4 - 20 °C)

(III): |Temp2 - Temp5| ≤ 10°C

wherein Temp1 is a roller temperature (°C) of the belt fixing and smoothing device in heating and image-fixing;

Temp2 is a melting point (°C) of the wax in the toner; Temp3 is a glass transition point (°C) of the binder in the toner; Temp4 is a temperature (°C) at which the belt member is released; Temp5 is a melting point (°C) of the wax in the toner-image-receiving layer of the electrophotographic image-receiving sheet; and Temp6 is a glass transition point (°C) of the binder in the toner-image-receiving layer of the electrophotographic image-receiving sheet.

2. An image forming process according to Claim 1, wherein the roller temperature in heating and image-fixing (Temp1) is from 100°C to 160°C; the glass transition point of the binder in the toner (Temp3) is from 40°C to 90°C; the temperature at which the belt member is released (Temp4) is from 20°C to 90°C; and the glass transition point of the binder in the toner-image-receiving layer of the electrophotographic image-receiving sheet (Temp6) is from 40°C to 90°C.

3. An image forming process according to Claim 1, the belt fixing and smoothing device, and the electrophotographic image-receiving sheet further satisfy the following condition represented by Expression (IV):
(IV): $\text{Temp7} > \text{Temp5} > \text{Temp6} > (\text{Temp4} - 20 \text{ } ^\circ\text{C})$

wherein Temp4, Temp5, and Temp6 have the same meanings as defined above; and Temp7 is a drying temperature (°C) of a coated layer of the toner-image-receiving layer in the electrophotographic image-receiving sheet.

4. An image forming process according to Claim 3, wherein the drying temperature of the coated toner-image-receiving layer in the electrophotographic image-receiving sheet (Temp7) is from 70°C to 150°C.

5. An image forming process according to Claim 1, wherein the electrophotographic image-receiving sheet further satisfies the following condition represented by Expression (V):

$$(V): \gamma_{sp}^0 - \gamma_{sp}^1 \geq 2.5 \text{ [mJ/m}^2\text{]}$$

wherein γ_{sp}^0 [mJ/m²] is a polar component of the surface free energy of the toner-image-receiving layer of the electrophotographic image-receiving sheet after coating and drying and before image-fixing; and γ_{sp}^1 [mJ/m²] is a polar component of the surface free energy of the toner-image-receiving layer of the electrophotographic image-receiving sheet after image-fixing.

6. An image forming process according to Claim 1,

wherein the wax in the toner and in the toner-image-receiving layer each have a melting point of 70°C to 95°C.

7. An image forming process according to Claim 1, wherein the wax in the toner-image-receiving layer is a water-dispersible wax having an average particle diameter of 0.05 µm to 2.0 µm.

8. An image forming process according to Claim 1, wherein the belt member comprises a support film, and a releasing layer arranged on the support film.

9. An image forming process according to Claim 8, wherein the releasing layer has a thickness of 1 µm to 200 µm.

10. An image forming process according to Claim 8, wherein the releasing layer comprises one of a fluorocarbonsiloxane rubber layer alone, and, a combination of a silicone rubber layer and a fluorocarbonsiloxane rubber layer arranged on the silicone rubber layer.

11. An image forming process according to Claim

10, wherein the fluorocarbon siloxane rubber comprises a main chain which contains at least one of perfluoroalkyl ether group and perfluoroalkyl group therein.

12. An image forming process according to Claim 1, wherein the electrophotographic image-receiving sheet comprises:

a support, the support comprising;

a raw paper, and

at least one thermoplastic resin layer arranged on each side of the raw paper.

13. An image forming process according to Claim 1, wherein the toner-image-receiving layer comprises a thermoplastic resin and has a thickness of 3 μm or more.

14. An image forming process according to Claim 1, wherein the wax in the toner-image-receiving layer of the electrophotographic image-receiving sheet is at least one of carnauba wax and montan wax.

15. An image forming process according to Claim 1, wherein the wax in the toner is at least one of paraffin wax and polyethylene wax.

16. An image forming apparatus comprising:
a toner; and
a belt fixing and smoothing device which fixes
the toner onto an electrophotographic image-receiving
sheet,
wherein the toner containing at least a wax and a
binder;
the electrophotographic image-receiving sheet
having at least one toner-image-receiving layer containing
at least a wax and a binder;
the belt fixing and smoothing device comprising:
a heating and pressuring member,
a belt member,
a cooling device, and
a cooling and separating unit,
wherein the belt fixing and smoothing device, the
electrophotographic image-receiving sheet, and the toner
satisfy the following conditions represented by
Expressions (I), (II), and (III):

$$(I): \text{Temp1} > \text{Temp2} > \text{Temp3} > (\text{Temp4} - 20 \text{ }^{\circ}\text{C})$$

$$(II): \text{Temp1} > \text{Temp5} > \text{Temp6} > (\text{Temp4} - 20 \text{ }^{\circ}\text{C})$$

$$(III): |\text{Temp2}-\text{Temp5}| \leq 10 \text{ }^{\circ}\text{C}$$

wherein Temp1 is a roller temperature ($^{\circ}\text{C}$) of the belt
fixing and smoothing device in heating and image-fixing;
Temp2 is a melting point ($^{\circ}\text{C}$) of the wax in the toner;

Temp3 is a glass transition point (°C) of the binder in the toner; Temp4 is a temperature (°C) at which the belt member is released; Temp5 is a melting point (°C) of the wax in the toner-image-receiving layer of the electrophotographic image-receiving sheet; and Temp6 is a glass transition point (°C) of the binder in the toner-image-receiving layer of the electrophotographic image-receiving sheet.

17. An image forming apparatus according to Claim 16, the belt fixing and smoothing device, and the electrophotographic image-receiving sheet further satisfy the following condition represented by Expression (IV):

(IV): $\text{Temp7} > \text{Temp5} > \text{Temp6} > (\text{Temp4} - 20 \text{ °C})$
wherein Temp4, Temp5, and Temp6 have the same meanings as defined above; and Temp7 is a drying temperature (°C) of a coated layer of the toner-image-receiving layer in the electrophotographic image-receiving sheet.

18. An image forming apparatus according to Claim 16, wherein the electrophotographic image-receiving sheet further satisfies the following condition represented by Expression (V):

(V): $\gamma_{\text{sp}}^0 - \gamma_{\text{sp}}^1 \geq 2.5 \text{ [mJ/m}^2\text{]}$

wherein γ_{sp^0} [mJ/m²] is a polar component of the surface free energy of the toner-image-receiving layer of the electrophotographic image-receiving sheet after coating and drying and before image-fixing; and γ_{sp^1} [mJ/m²] is a polar component of the surface free energy of the toner-image-receiving layer of the electrophotographic image-receiving sheet after image-fixing.